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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/595,075	06/16/2000	Ho-Jin Kweon	03364.P050	9724

7590 02/27/2003

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EXAMINER
DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
1745	9

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/595,075	Kweon et al.
Examiner	**Art Unit**
Tracy Dove	1745

-- The MAILING DATE of this communication appears on the c ver sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Dec 27, 2002*.

2a) ☒ This action is **FINAL.** 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1, 3, and 9-14* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) *12-14* is/are allowed.

6) ☒ Claim(s) *1, 3, and 9-11* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This Office Action is in response to the communication filed on 12/27/02. Applicant's arguments have been considered, but are not persuasive. Claims 1, 3 and 9-11 remain rejected in view of the prior art of record. Claims 12-14 are allowed. This Action is made **FINAL**, as necessitated by amendment.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3 and 9 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 has been amended to recite "$0.01 \leq y$", which is not supported by the specification as filed. Specifically, values of y greater than 0.1 are not supported. It is believed the "0.1" endpoint for "y" in claim 1 was inadvertently deleted.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 3 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Li, WO 97/49136.

Li teaches a lithium ion battery having a positive electrode material including a lithiated metal oxide core coated with a lithium ion conductor. The core material is preferably a lithiated transition mixed-metal oxide wherein the transition metals are selected from cobalt, nickel, vanadium, titanium and mixtures thereof. The coating material is preferably an alkali metal-metal oxide wherein the metal are selected from cobalt, vanadium, titanium, aluminum, boron and mixtures thereof. See page 6, lines 1-22. Li teaches that aluminum may be contained in the core material and the coating material (page 7, lines 3-4). Coating may broadly be construed as a physical treatment such as the application of a shell encapsulating the core and/or a surface treatment (page 11, lines 10-12). Elemental aluminum and/or boron may additionally be added to the core (lithium nickel cobalt oxide) to improve the properties thereof (page 12, lines 15-19).

The coating thickness may range from very thin at the monomolecular level, up to the micron level (page 13, lines 21-23). A thickness of 10 nm is taught on page 14, lines 6-7. See also page 15, lines 9-12 regarding the coating process.

Thus the claims are anticipated.

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Claims 1, 3 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Kweon et al., US 6,372,385.

Kweon teaches a lithium secondary battery having a positive electrode of the formula:

$LiA_{1-x-y}B_xC_yO_2$ (wherein $0<x\leq 0.3$, $0\leq y\leq 0.01$)

having a surface coated with a metal oxide. See abstract. In the formula, A is preferably nickel, B is preferably cobalt and C is preferably aluminum or strontium (col. 4, lines 57-62). Note C may be an element such as Ni, Co, Mn, B, Mg, Ca, Sr, Ba, Ti, V, Cr, Fe, Cu or Al (abstract). The metal of the metal oxide is Mg, Al, Co, K, Na or Ca, preferably Mg (col. 5, lines 45-47). Kweon teaches a dip coating method is used as it is simple to execute (col. 5, lines 40-43). The active material particles have a particle size of 0.1-100 μm (col. 6, lines 19-22) and the metal oxide has a thickness of 5-15 nm (col. 17, lines 1-10).

Thus the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka, US 6,037,095 in view of Nishida et al., JP 08-236114 (see attached machine translation of document).

Miyasaka teaches a lithium secondary battery having a positive electrode material of the formula $Li_xNi_{1-y}Co_{y-k}M_kO_{2-z}X_a$ where M may be Al, Mg or Ti, X is a halogen atom, and "x", "y", "k", "z" and "a" satisfy the requirements shown in col. 4, lines 26-40. See col. 6, for examples of the positive active materials disclosed by Miyasaka.

Miyasaka does not explicitly state the positive active material is coated with a metal oxide.

However, Nishida teaches a lithium secondary battery having a positive electrode active material of a lithium transition metal multiple oxide which is coated with a metal oxide such as MgO, CaO or aluminum oxide. See page 1, paragraph [0006]. The lithium transition metal oxide may be a lithium nickel cobalt oxide (page 1, [0007]). The thickness of the coating is controlled by the method of applying the coating.

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Miyasaka teaches the surface of the positive active material may be modified (col. 10, lines 48-49). Furthermore, Nishida teaches that the

metal oxide coating may be applied to various lithium transition metal oxide materials of lithium secondary batteries (page 3, [0029]). One of skill would be motivated to coat the surface of the positive active material of Miyasaka with the metal oxide coating of Nishida because the charge/discharge cycle properties of the lithium secondary battery would be enhanced (see page 1, [0001] and Table 1). Miyasaka suggests the surface of the positive active material may be modified.

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remove

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka, US 6,037,095 in view of Kweon, US 6,372,385.

Miyasaka teaches a lithium secondary battery having a positive electrode material of the formula $Li_xNi_{1-y}Co_{y-k}M_kO_{2-z}X_a$ where M may be Al, Mg or Ti, X is a halogen atom, and "x", "y", "k", "z" and "a" satisfy the requirements shown in col. 4, lines 26-40. See col. 6, for examples of the positive active materials disclosed by Miyasaka.

Miyasaka does not explicitly state the positive active material is coated with a metal oxide.

However, Kweon teaches a lithium secondary battery having a positive electrode of the formula: $LiA_{1-x-y}B_xC_yO_2$ (wherein $0<x\leq 0.3$, $0\leq y\leq 0.01$) having a surface coated with a metal oxide. See abstract. In the formula, A is preferably nickel, B is preferably cobalt and C is preferably aluminum or strontium (col. 4, lines 57-62). Note C

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may be an element such as Ni, Co, Mn, B, Mg, Ca, Sr, Ba, Ti, V, Cr, Fe, Cu or Al (abstract). The metal of the metal oxide is Mg, Al, Co, K, Na or Ca, preferably Mg (col. 5, lines 45-47). Kweon teaches a dip coating method is used as it is simple to execute (col. 5, lines 40-43). The active material particles have a particle size of 0.1-100 μm (col. 6, lines 19-22) and the metal oxide has a thickness of 5-15 nm (col. 17, lines 1-10).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Miyasaka teaches the surface of the positive active material may be modified (col. 10, lines 48-49). One of skill would be motivated to coat the surface of the positive active material of Miyasaka with the metal oxide coating of Kweon because the charge/discharge cycle properties of the lithium secondary battery would be enhanced (see the Figures). Miyasaka suggests the surface of the positive active material may be modified.

Allowable Subject Matter

Claims 12-14 are allowed.

The prior art does not teach or suggest the positive active material of claim 12 coated with a metal oxide.

Response to Arguments

Applicant's arguments filed 12/27/02 have been fully considered but they are not persuasive.

Li (WO97/49136)

Applicant argues that Li does not teach or suggest a positive active material compound with a formula as recited in Applicant's Claim 1. However, Li teaches a positive electrode material including a lithiated metal oxide core coated with a lithium ion conductor. The core material is preferably a lithiated transition mixed-metal oxide wherein the transition metals are selected from *cobalt, nickel, vanadium, titanium and mixtures thereof.* Li teaches the most preferred core composition would comprise lithium nickel cobalt dioxide. See page 6, lines 1-22. Li teaches that *aluminum may be contained in the core material* and the coating material (page 7, lines 3-4). Elemental aluminum and/or boron may additionally be added to the core (lithium nickel cobalt oxide) to improve the properties thereof (page 12, lines 15-19).

Kweon (US6,372,385)

Applicant argues that the invention of Kweon '385 is not "by another". This is not correct, the four inventors of Kweon '385 are not the same four inventors of the instant application. Specifically, Sung-soo Kim is not a co-inventor of the instant application and Hyun-Sook Jung is not a co-inventor of Kweon '385. Thus, the Kweon '385 patent is "by another" and the rejection is maintained.

The declaration under 37 CFR 1.132 filed 12/27/02 is insufficient to overcome the rejection of claims 1, 3 and 9 based upon Kweon et al., US 6,372,385, as set forth in the last Office action because all of the inventors of the '385 patent are not the same inventors of the instant application as stated in the declaration.

Regarding the priority document, the priority date of 6/17/99 is after the filing date of Kweon '385.

Miyaki (US6,365,299)

The 35 U.S.C. 102(e) rejection in view of Miyaki has been withdrawn.

Miyasaka in view of Nishida et al.

Applicant argues Miyasaka does not teach or suggest a metal oxide coating for the positive active material. However, Nishida teaches that coating positive active materials of lithium-transition metal composite oxides with a metal oxide enhances the charge/discharge cycle properties of a lithium secondary battery containing the metal oxide coated active material. Miyasaka teaches and suggests the surface of the positive active material may be modified. One of skill in the art would have known that coating the active material of Miyasaka with a metal oxide (taught by Nishida) would have resulted in enhanced charge/discharge cycle properties of the lithium secondary battery. See page 6 of the Action dated 9/9/02.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Miyasaka in view of Kweon

Applicant argues Kweon is not prior art to the present Application. However, Kweon is prior art against the present invention. See argument above regarding the anticipation rejection in view of Kweon.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-

0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

February 24, 2003

Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700